

Claims

1. A surface acoustic wave filter, comprising:

a piezoelectric substrate;

plural numbers of interdigital transducer electrodes

5 arranged on a surface of the piezoelectric substrate as well as on a first surface acoustic wave propagation path, reflector electrodes arranged at least at both ends of a first electrode pattern formed including the plural IDT electrodes, one or more interdigital transducer electrodes arranged on the surface of
10 the piezoelectric substrate as well as a second surface acoustic wave propagation path which is different from the first surface acoustic wave propagation path, and reflector electrodes arranged at least at both ends of a second electrode pattern formed including the interdigital transducer electrode, and

15 wherein the interdigital transducer electrodes on the first surface acoustic wave propagation path are electrically connected in series by connection wirings, and

the interdigital transducer electrode on the second surface acoustic wave propagation path is connected between
20 the connecting wirings and the ground, and

the connecting wirings are arranged between the first electrode pattern and the second electrode pattern.

2. The surface acoustic wave filter of claim 1,

wherein at least one surface acoustic wave resonator is
25 formed by the interdigital transducer electrode arranged on

the second surface acoustic wave propagation path and reflector electrodes arranged at least at both ends of the second electrode pattern formed including the interdigital transducer electrode.

5 3. The surface acoustic wave filter of claim 1,
 wherein ones of terminals of plural interdigital transducer electrodes arranged on the second surface acoustic wave propagation path are connected to the ground, and the others of terminals are connected to different connecting wirings
10 respectively.

 4. The surface acoustic wave filter of any of claims 1 to 3,
 wherein the plural interdigital transducer electrodes disposed on the first surface acoustic wave propagation path
15 and electrically connected in series can be arranged so that phases of adjacent interdigital transducer electrodes are the reverse of each other.

 5. The surface acoustic wave filter of any of claims 1 to 3,
20 wherein a reflector electrode is provided between the interdigital transducer electrodes of the first electrode pattern formed including the plural interdigital electrodes.

 6. The surface acoustic wave filter of claim 5,
 wherein the reflector electrode provided between the
25 interdigital transducer electrodes of the first electrode

pattern is connected to the ground.

7. The surface acoustic wave filter of claim 5,
wherein the interdigital transducer electrodes of the
first electrode pattern are electrically connected in series
5 through the reflector electrodes.

8. The surface acoustic wave filter of claim 5,
wherein in the first electrode pattern, the adjacent
interdigital transducer electrodes are arranged so that phases
thereof are same to each other.

10 9. A surface acoustic wave filter comprising surface
acoustic wave resonators, comprising:

a piezoelectric substrate;

plural numbers of interdigital transducer electrodes
arranged on a surface of the piezoelectric substrate as well
15 as on a first surface acoustic wave propagation path, reflector
electrodes arranged at least at both ends of a first electrode
pattern formed including the plural interdigital transducer
electrodes, one or more interdigital transducer electrodes
arranged on the surface of the piezoelectric substrate as well
20 as a second surface acoustic wave propagation path which is
different from the first surface acoustic wave, and reflector
electrodes arranged at least at both ends of a second electrode
pattern formed including the interdigital electrode, and

wherein ones of terminals in the interdigital transducer
25 electrodes on the first surface acoustic wave propagation path

are respectively connected to the ground and the others of terminals are connected to separate terminals of the surface acoustic wave resonator.